Progress in Surface Science

An International Review Journal

EDITOR: Professor Sydney G. Davison

AUTHOR AND SUBJECT INDEX

Volume 45, 1994

PERGAMON

Progress in Surface Science

EDITOR-IN-CHIEF:
PROF. SYDNEY G. DAVISON

MANAGING EDITOR:
PRUDENCE G. DAVISON

EDITORIAL OFFICE
Applied Mathematics Department
University of Waterloo
Waterloo, Ontario
Canada N2L 3G1

Tel: **(519) 885-1211 (ext. 3161)**
Fax: **(519) 746-6530**
e-mail: **watserv1.uwaterloo.ca**

ADVISORY BOARD

I. BARTOŠ
Academy of Sciences
Prague, Czech Republic

B.E. CONWAY
University of Ottawa
Ontario, Canada

A.S.G. CURTIS
University of Glasgow
Scotland

A.W. CZANDERNA
NREL Golden,
Colorado, U.S.A.

J.G. DILLARD
Virginia Polytechnic Institute
and State University
Blacksburg, Virginia, U.S.A.

D.D. ELEY
University of Nottingham
England

P.J. ESTRUP
Brown University, Providence,
Rhode Island, U.S.A.

V.E. HENRICH
Yale University, New Haven,
Connecticut, U.S.A.

S. KONO
Tohoku University
Aobaku, Japan

J. KOUTECKY
Freie Universität
Berlin, Germany

R.M. LATANSION
MIT, Cambridge,
Massachusetts, U.S.A.

J.D. LEVINE
Texas Instruments
Dallas, Texas, U.S.A.

A.A. MARADUDIN
University of California
Irvine, California, U.S.A.

K. MULLER
University of Erlangen-Nurnberg
Germany

A.G. NAUMOVETS
Academy of Sciences
Kiev, Ukraine

J.B. PENDRY
Imperial College
London, England

S.T. PICRAUX
Sandia National Laboratory
Albuquerque, New Mexico, U.S.A.

T.N. RHODIN
Cornell University
Ithaca, New York, U.S.A.

M. STĘŚLICKA
University of Wrocław
Poland

H. TI TIEN
Michigan State University
East Lansing, Michigan, U.S.A.

H. UEBA
Toyama University
Japan

L. WEISS
Roswell Park Memorial Institute
Buffalo, New York, U.S.A.

R.F. WILLIS
Pennsylvania State University
University Park, Pennsylvania, U.S.A.

K. ZHANG
Fudan University, Shanghai,
People's Republic of China

Production Editor: Douglas Cherno, E-mail: D.CHERNO@ELSEVIER.COM.

Publishing, Subscription and Advertising Offices: Elsevier Science Inc., 660 White Plains Road, Tarrytown, New York 10591-5153, U.S.A., E-mail Address: ESUK.USA@ELSEVIER.COM; and Elsevier Science Ltd, The Boulevard, Langford Lane, Oxford, OX5 1GB, England.

Published Monthly. *Annual Institutional Subscription Rates* (1994): North, Central and South America, U.S.$645.00, Rest of World £418.00. Associated Personal Subscription Rates are available on request for those whose institutions are library subscribers. Sterling prices exclude VAT. Non-VAT registered customers in the European Community will be charged the appropriate VAT in addition to the price listed. Prices include postage and insurance and are subject to change without notice.

List of Contents, Volume 45, 1994

SELECTED WORKS OF B.V. DERJAGUIN VOLUME 3:
Formation and Growth of the New Phase and New Surfaces

Part 1 - General Theory of Nucleation	1
Part 2 - Synthesis of Diamond From Gases	57
Part 3 - Formation of a New Interface: Adhesion	95
Part 4 - Fractoemission of Neutron and Cold Nuclear Fusion	233
Part 5 - Friction of Solid Bodies	247
Part 6 - New Measurement Methods	337

PROGRESS IN SURFACE SCIENCE, VOLUME 45

AUTHOR INDEX

Abrikosova, I.I. 142
Adlfinger, K.H. 43
Aisenberg, S. 94
Akhmatov, A.S. 276, 294, 316, 327, 336
Aleinikova, I.N. 107, 123, 130, 143, 153, 198, 218, 231, 235
Alekseenko, A.B. 94
Aliev, A.D. 235, 241
Allen, L.B. 9
Altoiz, B.A. 49, 56, 336
Amelin, A.G. 9
Andersson, Z.P. 94
Andrews, E.H. 218
Angus, D. 70
Angus, D.C. 70, 79
Anikin, B.A. 375
Anisimova, V.I. 174, 189
Arnold-Alab'eev, V.K. 276
Artsimovich, L.A. 235, 236, 241
Artyemov, I.S. 367
Aslanova, M.S. 130
Averbukh, B.G. 189

Bakanov, S.P. 374
Bakul, V.N. 375
Barenblatt, G.I. 167
Barlow, E.J. 39
Barrer, R.M. 374
Barrie, I.A. 374
Bartenev, G.M. 316, 327
Bastow, S. 294
Batel, W. 375
Beeck 281
Behring, B.P. 344
Berg, S. 94
Berkov, V.I. 241
Bikerman, J.J. 295
Bircumshaw, L. 248, 259
Blander, M. 8, 20
Blekherman, M.K. 167
Blinov, L.M. 56
Blok, H. 276, 336
Böhme, G. 123, 153
Boinovich, L.B. 43
Bowden, F. 276, 294
Bowden, F.P. 294, 295, 316, 327, 336
Bradley, R.S. 142, 167
Briggs, G.A.D. 218
Brinkman, D.A. 70
Briscoe, B.J. 218
Brock, J.F. 375
Budnevich, S.S. 336
Buelva, M. 43
Buff, F.P. 8, 20
Buhovets, V.L. 87
Builov, L.L. 70, 83
Bundy, F.R. 70, 79
Burta-Gapanovitch, L.N. 153

Carman, P.C. 374
Carré, A. 218
Chabot, R.J. 94
Chalych, A.E. 241
Chalykh, A.E. 235
Chan, D.Y. 43
Chandrasekhar, S. 49
Chara, Kerji 189
Chatterjee, A. 374
Chernoberezhskii, Yu.M. 43
Chochlov, V.I. 198
Chowdry, A. 218
Chubarov, M.M.M.M. 43
Churaev, N.V. 43, 155
Churakov, V.V. 367
Clar, J.W. 344
Collins, R.E. 375
Cottrell, G.A. 218
Cranberg, L. 103

Dahneke, B. 142, 155, 167
Dahneke, B.J. 167
Dallavalle, J.M. 375
Danilova, V.A. 374
Davies, D.K. 218
Davletshin, R.A. 123, 130, 198, 231
de Gennes, P.G. 49
de Ninno, A. 245
de Vries, A.J. 28
Debeau, D.E. 327
Demin, V.M. 235, 241
Derjaguin, B.V. 28, 39, 43, 49, 56, 65, 70, 80, 83, 87, 94, 103, 104, 107, 118, 123, 130, 142, 143, 153, 155,

(Derjaguin, cont.)
167, 174, 189, 218, 230, 231, 235, 236, 241, 245, 276, 281, 316, 327, 335, 336, 367, 374, 375, 382
Deryagin, B.V. 8, 9, 20, 70, 235
Deryaguin, B.V. 294, 295
Dickinson, J.T. 235
Distler, G.I. 153
Donald, D.K. 130, 153
Donaldson, E.E. 235
Dukhin, S.S. 43
Dumansky, A.V. 43
Dvornichenko, G.L. 43
Dwight, H.B. 142
Dwite, G.B. 167
D'yachek, T.P. 235
Dykman, I.M. 294
Dzyaloshinskij, I.F. 142

Ekserova, D. 43
Elinson, M.I. 174
Elman, R.I. 367
Enikolopyan, N.S. 241
Evans, D.F. 43
Eversole, W.G. 70
Exerowa, D. 39

Fedorovin, A.A. 367
Fedoseev, D.V. 65, 70, 80, 83, 87, 94, 375
Filipenko, B.P. 153
Fleishmann, M. 236
Flippovskij, V.V. 374
Frank-Kamenetsky, D.A. 80
Frans, G. 230
Frenkel, J. 6, 14, 249
Frenkel, Ya I. 8, 20
Frumkin, A.N. 43
Fuller, K.N.G. 198, 218
Futran, M.F. 336
Fyodorova, B.F. 367

Galimov, E.M. 80
Gane, N. 316
Gaustad, G.E. 87, 94
Gennes, P.G. de 49
Gent, A.N. 218
Gerasimov, Yu.M. 153
Gerebkov, S.D. 104
Gerifalco, L.A. 374
Givens 281
Glazman, J.M. 294
Golovin, Yu.I. 235
Golubev, T.M. 374
Golymov, E.M. 94
Goodrich, F.C. 8, 20
Gorbunov, N.S. 374
Gorkovenko, K.A. 374
Goryuk, A.A. 43
Gradstein, I.S. 142, 167
Green-Kelly, D. 43
Gregg, S.J. 375
Griffith, A.A. 167
Gucker, F.F. 367
Gusev, V.A. 87, 94
Gutop, Yu.V. 28, 39

Hamaker, H.C. 142
Hardy, F. 248
Hardy, W. 43, 248, 252, 259, 295
Harper, W.R. 130, 153, 198, 218
Heinicke, G. 235, 236, 241
Helmholtz, C.L.F. 189
Henniker, J.C. 294
Hertz, H. 142
Hrustalev, V.A. 130
Hyges, G. 276, 336
Hyodo, S. 198

Indenbom, V.L. 167
Ioffe, A.F. 118
Ishlinsky, A.Yu. 336
Israelachvili, J.N. 43, 155
Ivashchenko, V.V. 374
Ivzhenko, N.N. 43
Izmailova, G.I. 107, 281

Joffe, A.F. 307
Johnson, K.L. 142, 155, 167, 218
Jones, S.E. 236, 245
Josefowitz, D. 103

Kagan, Yu. 20, 28
Kallmann, H. 230
Karanikolo, V.F. 235, 241
Karasev, V.V. 43, 103, 107, 174, 175, 189, 336
Kashcheev, V.N. 198, 218
Kashchiev, D. 39
Kassner, I.L., Jr. 9
Katz, I.L. 8
Keiji, Chara 189
Kendall, K. 142, 155, 167, 218
Khodakov, R.S. 374
Khodan, A.N. 87
Khokhlov, V.A. 218
Kietenko, V.S. 367
Kilchitskaya, S.S. 153
Kinloch, A.J. 218
Kirillova, Y.M. 104
Kirillova, Yu.M. 107, 189
Kirkwood, I.G. 8
Kiselev, V.P. 49

Kitaev, A.V. 123, 130, 153
Kitchener, I.A. 142
Kleinman, M.E. 8
Kling, W. 123
Kluev, V.A. 174, 236, 241, 245
Klytshkov 281
Klyuev, V.A. 189, 235
Kogan, Y.I. 9
Kohno, A. 198
Kondo, S. 9, 20
Konig, F.O. 20
Konvisarov, D.V. 327
Kotlyarevskaja, G.G. 153
Kotlyarevskaya, G.G. 123, 130
Kottler, W. 130
Kozeny, K. 374
Kragel'skej, I.V. 327
Kragelski, J.V. 295
Kragelsky, I.V. 336
Kramer, J. 189
Kramers, H.A. 28, 39
Kraus, G. 374
Krotova, N.A. 103, 104, 107, 118, 123, 130, 143, 153, 174, 189, 218, 230, 235, 241, 307, 316, 327
Krupp, H. 123, 130, 143, 153, 218, 230
Krylov, N.A. 294
Kudryavtsev, S.I. 367
Kudryavtseva, N.M. 367
Kudryavzeva, N.M. 230
Kuni, F.M. 8
Kurochkina, M.I. 374
Kusakov, M.M. 276, 336
Kussakov, M.M. 43, 294, 295
Kuznelsov, V.A. 236
Kuznetsov, O.L. 235
Kuznetzov, O.L. 241

LaMer, V.K. 367
Landau, L.D. 20, 28, 39, 118, 142, 167, 198, 218, 294, 307, 367
Lange, H. 123
Langlois, W.E. 39
Lavrent'ev, A.V. 94
Lazarev, V.P. 103, 276, 281, 294, 295, 316, 327, 335, 336
Lebedeva, L.A. 276
Lebedeva, L.S. 295
Lee, P.K. 367
Leibenson, L.S. 142, 167
Leipunskii, O.I. 70, 94
Lejipunsky, O.I. 79
Lichtman, V.I. 374
Lifshits, E.M. 28, 118, 142, 167
Lifshitz, E.M. 20, 28, 39, 142, 198, 218, 307
Lipson, A.G. 235, 236, 241, 245
Lomonosov, M.V. 367
Lopatina, A.M. 43
Lopatina, G.G. 65, 70
Lossinka, H. 250
Lothe, J. 6
Low, F. 43
Low, P.F. 43
Lowell, J. 218
Lukjanovitch, V.M. 80
Lunev, V.D. 374
Lushikov, B.I. 241
Lutsau, V.G. 65
Lutzau, V.G. 83
Lyutsay, V.G. 70

Maguis, D. 218
Maibuk, Z.-M. Ya. 235
Maibuk, Z.Yu. 241
Maksak, V.I. 218
Malkina 281
Malysheva, D.S. 276, 294
Mambetov, D.M. 189
Manev, E. 43
Margolina, T.L. 103
Mark, H. 103
Markevitch, T.T. 103
Martinov, G.A. 230
Martynov, G.A. 43, 382
Matyshenko, N.N. 87
Matyushenko, N.I. 94
Maugis, D. 218
McCrachen, G.M. 245
McGuiggen, P.M. 43
Medley, I.A. 107
Medley, J.A. 218
Medvedeva, A.M. 104, 230, 316
Metsik, M.S. 153, 230
Mikhovich, N.S. 218
Mikirov, A.E. 367
Mitchell, D.J. 43
Morozova, L.P. 130, 230
Mueller, W.M. 245
Muller, V.M. 43, 155, 167, 218, 230
Musuraliev, T. 189

Nata, Toshio 189
Nelidov, V.A. 374
Nikitenko, I.I. 49, 56
Ninham, B.W. 43

Obreimoff, I.W. 103
Obukhov, E.V. 295
O'Konski, C.T. 367
Ono, S. 9, 20
Orlov, V.I. 235

Orr, C. 375
Ottewill, R.H. 367
Overbeek, J. 294
Overbeek, J.Th.G. 367

Pailthorpe, B.A. 43
Panichkina, V.V. 374
Parfanovich, B.H. 123, 231
Parfanovitch, B.N. 130, 153
Park, M.K. 235
Pashley, B.M. 43
Pavlov, N.A. 276
Peschel, G. 43
Peterson, I.W. 103, 327
Peterson, W. 107
Pethica, J.B. 218
Pethica, M.D. 218
Pichughin, E.F. 336
Pichuguin, E.F. 294
Pichyuguin, E.F. 276
Pickard, H.B. 367
Pitaevskij, L.V. 142
Pitshugin 281
Pitts, G.N. 367
Plesset, M.S. 39
Poljakov, A.M. 130
Pollock, H.M. 218
Poluektova, G.B. 374
Popovskij, A.Yu, 49, 56
Popovskij, Yu.M. 56
Popovsky, Yu.M. 43, 49, 336
Poretskaya, A.P. 327
Poretzhaja, A.P. 103
Pound, G.J. 6
Pozdnyakov, O.F. 235, 241
Prokhorov, A.V. 20, 39
Prokhorov, P.S. 367
Prokhorov, V.S. 94
Proshin, V.A. 123, 130, 153
Prosser, A.P. 142
Prut, E.V. 235, 241
Pulatov, A.A. 235, 241
Push, V.E. 336
Pushchin, N.I. 367

Rabenhorst, H. 130, 153
Rabinovich, Ya.I. 43
Resnyanskij, V.F. 174
Rideal, E.K. 295
Rigden, P.J. 374
Rivkin, S.M. 130
Rjabov, V.A. 80
Roberts, A.D. 142, 155, 167, 218
Ronsanov, A.I. 8
Rose, D.J. 367
Ross, J.W. 374
Roth, C.B. 43
Rumpf, H. 198, 218
Ruppel, W. 153
Rutzler, I.E. 104
Ruzhik, I.M. 142
Ryabikova, Z.A. 375
Ryabov, V.A. 70
Ryshik, I.M. 167

Sakov, D.M. 241
Samyghin, M.M. 336
Samyguin, M.M. 276, 294, 295
Sandstede, G. 123, 153
Saslaw, W.C. 87, 94
Sasorov, V.P. 65
Sauerwald, F. 250
Savage, R.Z. 104
Scheludko, A.D. 382
Schlaile, H.G. 153
Schmellenmeier, H.Z. 94
Schmidt, B. 250
Schnabel, W. 130, 153
Schubert, H. 218
Schultz, J. 218
Schutz, W. 218
Semenikhin, S. 276
Serpinsky, V.V. 344
Shabalin, E.P. 241
Shatalova, I.G. 374
Shchedrov, V.S. 327
Sheludko, A.D. 43
Sherbakov, L.M. 20
Shibaeva, E.Yu. 49, 56
Shilov, V.V. 374
Shishin, V.A. 43
Siedentopf, H. 367
Silenko, G.P. 49, 56
Sing, K. 375
Sjutkin, N.F. 294
Skinner, J. 316
Skinner, S.M. 104
Smilga, V.P. 107, 123, 130, 153, 174, 175, 189, 218, 230, 235, 241, 307, 316, 327
Smirnov, N.S. 367
Smith 281
Sobolev, G.A. 235, 241
Sokolina, G.A. 130
Sommer, K. 198, 218
Sorokin, S.M. 103
Sperling, G. 123, 218
Spitsyn, B.V. 70, 80, 94
Stanley-Wood, N.G. 374
Steier, K. 198
Stephanovitch, N.A. 130
Storozhilova, A.F. 367
Strakhovski, G.M. 294
Strakhovsky, G.M. 276
Strelkov, A.V. 241
Strel'nitskij, V.E. 87

Strel'nitsky, V.E. 94
Strikha, V.I. 153
Svechkarev, Yu.M. 235
Svechkarev, Yu.N. 241

Tabor, D. 155, 167, 198, 218, 230, 276, 294, 295, 316, 327, 336
Talaev, M.V. 374
Talaev, U.V. 375
Tamm, I.E. 218
Tartakovskij, I.P. 374
Teremetskaya, I.G. 87
Terzaghi, K. 259, 295, 316, 327
Tescherbakov, L.M. 9
Thomas, A.G. 218
Throssel, S. 294
Timofeev, D.P. 374
Titijevskaja, A.S. 295
Tolman, R.C. 20
Tolstoi, D.M. 336
Tomachev, Yu.N. 87
Tomfeld, I.N. 123, 130, 231
Tomfeld, N.N. 153
Tomlinson, G. 248
Tomlinson, G.A. 143, 327
Toporov, Ju.P. 130, 316
Toporov, Yu.P. 123, 143, 153, 155, 167, 174, 175, 189, 198, 218, 231, 235, 236, 241, 327, 336
Toshio, Nata 189
Tsherbakov, L.M. 8
Tyualin, Yu.I. 235
Tyurikova, L.A. 189

Uchuvatkin, G.N. 327
Ul'berg, Z.P. 43
Ur'ev, N.B. 43
Uspenskaya, K.S. 80, 94
Utchuvatrin, G.N. 316
Uvarova, I.V. 374

van Grunderbeek, F. 367
van Krevelen, D.W. 218
Varnin, V.P. 80, 83, 87, 94
Varshavskaya, I.G. 94
Vasiliev, G.F. 174
Vauchkiy, Yu. P. 374
Vavilov, S. 367
Verwey, E. 294, 367
Viani, B.E. 43
Vishnepolskaya, I.V. 9
Vladikina, T.N. 174
Vlasenko, G.Ya. 9, 367
Vnukov, S.P. 87, 94, 375
Vojuskii, S.S. 230
Voyutsky, S.S. 103
Vrij, A. 28

Walter, G. 130
Walton, W.H. 367
Watillon, A. 367
Weinberg, B.P. 276
Weinberg, K.B. 276
Weinberg, K.B., Jr. 336
Westgate, C.R. 218
Wilkins, D.J. 367
Wilstätter, M. 230

Yushchenko, V.S. 198, 218

Zakhavaeva, N.N. 43, 276, 294, 295, 336, 374
Zamasy, V.M. 103
Zarhin, L.S. 241
Zarkhin, L.S. 235
Zel'dovich, J.B. 6, 14, 20
Zeldovich, Ya.B. 28, 39
Zherebkov, S.K. 230, 316
Zhevandrov, N.D. 56
Zimon, A.D. 130, 153, 230
Zorin, Z.M. 43, 294
Zsigmondy, R. 367
Zwick, S.A. 39

SUBJECT INDEX

Adhesion
  electrical phenomenon in 95-103
    chain diffusion in, role of 102-103
    electric theory of adhesion 95-97
    emission of electrons in, adhesion and cohesion failures 100-103
    theory of adhesion and 97-100
  in formation of new interface 95-230
  in rolling friction, 308-315. See also Rolling friction
Adhesion force
  contact electrification influence
    elastic particles to rigid smooth surface 199-218. See also Contact electrification
  dielectric elastic spheres to rigid smooth surface 199-218
Adhesion of elastic particles
  pressing-on and 192-198
    under dynamic load 194-196
    electrostatic interaction sphere-plane 193-194
    inertial forces effect and 194-195
    under static load 196-198
Adhesion of particles
  double electric layer effect on rolling friction 108-118
  electric phenomenon in 95-103
  true identity of double layer at metal-dielectric interface 105-107
Adhesion of polymer particles
  contact deformation effect on 131-142
    calculation of sticking force and contact deformations 135-142
(Adhesion, polymer...)
    problem and approaches 131-132
    surface shape of spherical particle in 132-135
  electrostatic properties of in contact with photoconductor surface 144-153
    charge distribution in 150-151
    donor-acceptor interaction in 149-150
    light effect on 150-152
    measurement of adhesion 145-146
    measurement of individual charges 146-148
  polytetrafluoroethylene film surface 168-173. See also High-energy electron emission
  to semiconductor surface 124-130
    electrostatic component 124-125
    electrostatic force from electric double layer 125-126
    selenium substrate under illumination 126-130
  to solid surface
    conclusions 122-123
    double layer charge on contact 119-121
    electrostatic forces in 119-123
    molecular versus electrostatic component 121-122
  spherical elastic interaction with rigid substrate 157-167
    analytical results 160
    conclusions 165-166
    contact forces approach in 159-160
    Derjaguin's theory of 157-158
    Johnson's theory of 158, 164

(Adhesion, spherical...)
noncontact forces approach in 160-163
numerical solution 163
results and discussion 163-165
Adhesion of polymers
mechanical disruption with high-energy electron emission 168-173. See also High-energy electron emission
Adhesion theory(ies)
aspects of
resistance of contact to rupture 223
strength of contact 223, 224-225
bond-breaking
nonequilibrium thermodynamically 223-224
electric 95-97
verification of 97-100
process of
adsorption 225
chemical vs. electrical 225-226
diffusion 225
electronic 225
illumination effect on adhesion 230
for lyophobic systems 227
particles in liquids 226
preliminary pressing in 229
separation of particles 227-229
solid bodies 224-226
Aerosols and hydrosols
flow-ultramicroscopic determination of number and particle size 345-366
Amonton law
dependence on friction load 294, 328, 329
deviations from 318-319, 320
friction force proportional to load 269, 310, 315, 317, 318

Balances
sensitivity of
enhancement of 341-342
net contact in 344
oscillation period shortening in 342-343
photoelectric method in 343-344
thyratron in 344

Bilayer film rupture
Gibbs grand ensemble and 29
homogeneous boiling of viscous liquid 29
homogeneous condensation of gas of defects 29
mechanisms in 30
problem statement 30-36
computation of probability 35
diffusion of vacancies 34-35
hydrodynamics of macrohole growth 33-34
work of nucleus hole formation 32-33
results 36-39
Black films
rupture of bimolecular 21-25
film and hole system in 26-28
versus other nuclear processes 24
variables in 24, 25
Boundary layers
surface forces influence on 40-43
Boundary lubrication
in kinetic friction 277-281
mechanical properties of 328-335
mechanism of and lubricating film properties 282-294
Boundary lubrication layer
blow-off method of viscosity measurement 284-289
interference patterns and 290-291
measurement method 287-288
results 288-289
set-up scheme 285-287
velocity profiles 288-289
mechanical properties of 328-335
boundary friction problems 330-331
boundary phases 331
on ice 331-333
molecular theory of friction 328-329
two-term law and 329-330
verification of 333-334, 335
mechanism of 282-294
blow-off method of viscosity measurement 284-289
opposing views of 283

(Boundary lubrication...)
viscosity determination and 284
properties of
versus bulk liquid 290
versus liquid crystals 291
two-term law of friction and 291-294
dependence of friction on load 292-293
versus one-term law 293-294
Boundary phases
surface forces influence on 40-43

Carbon
metastable phases of
homogeneous forms of 84-87
Cavitation
in nonvolatile liquid
Gibbs ensemble in 10-11
Zel'dovich formula 15
Cold nuclear fusion. See also Nuclear reaction
fractoemission of neutron and 233-242
Contact deformation
effect on particle adhesion 131-142
calculation of sticking force and 135-142
elastic restoration of 228
of elastic sphere in sticking to rigid plane 157-167
mechanics of 156
molecular forces role in 154-155, 157-167
Contact electrification
adhesion of elastic particles to rigid smooth substrate
adhesion measurement in 208-210
conclusions 217-218
experimental technique 208-211
mean density of surface charge determination 210-211
results
contact pressure effect and 212-216
electrostatic attraction 213-214
under external force 212
at preloading forces 213-214
tearing-off force 211-212
rough and smooth body 205-208

(Contact electrification...)
two smooth bodies 201-205
Crack, electron fluxes and energies 233, 237
Crystallization
joint graphite-diamond 59-60, 61, 62, 71

DD reactions
in titanium-deuterium system 236, 242, 243
in zirconium-deuterium system 242-245. See also Zirconium-deuterium (Zr-D) system
Diamond
lattices of 59
seed crystals of
nonwhiskeer 61
whisker crystals of 61, 65, 68-70, 83
Diamond synthesis from gases 57-94
chemical crystallization 89-94
experimental 91-94
growth of diamond vs. graphite 89-90
pulse supersaturations in 90, 91
rules for 91
formation of metastable phases at supersaturations 84-87
gas phase method 85, 86-87
laser method 86, 87
graphite in 57, 59-60, 61, 62, 71, 81-83, 90
history of 57-60
at low pressure 57-64
from carbonaceous gas 60, 62-64
from graphite 59-60, 61, 62
growth in 58
history of 57-60, 89
lattices of diamond and graphite in 59, 60
pulsed regime in 64
in metastable region
diffusion mode 73-75, 76
kinetic mode 74, 76, 77
with methane gas 75, 78, 79
procedure for 75-76
results 76-79
theory of 71-75
at ultra-low pressures 66-70
advantages of 66
chemical transport reactions in 68
from seed crystal 66, 67-68

(Diamond synthesis...ultra-low)
via nucleation 67
from whisker crystal 65, 68-70
Diamond versus graphite growth 59-60, 61, 62, 71, 81-83, 90, 91
Disperse bodies
measurement of specific surface 337-340
Knudsen flow mode 369-370
Disperse systems
condensation nuclei
flow count of 360-365
particle concentration and
Derjaguin-Vlasenko scheme I 346
Derjaguin Vlasenko ultra-flow microscope 351
flow particle counting scheme in 346-347
Gucker-O'Konski , scheme II 346-347, 348
measurement of 345
Mikirov method 348
particle concentration and measurement
flow ultramicroscope and
advantages of 350-354
applications of 358-360
in operation 348-350
particle size analysis and 354-358
study of coagulation of hydrosols 365-366
Double electric layer
effect of on rolling friction 108-118
charging and recombination in 108-113
dielectric or semiconducting cylinder over metal 108-113
distribution of double layer charge 113-114
force moment and 114-118
true density of at metal-dielectric interface 105-107

ELC. See Epitropic liquid crystal (ELC)
Electrostatic forces
in adhesion of polymers
to photoconductor 144-153
to semiconductor 124-130
to solid 119-123
Epitropic liquid crystal (ELC) layers
on quartz substrate 44-49
(Epitropic...quartz)
dependences in 45-48
nonmesogen liquids and 47, 48
orientation of molecules in 44-45, 46, 47, 49
properties of 44

Film rupture
bilayer 29-39
black bimolecular 21-25
Fractoemission of neutron. See also Nuclear reaction
and cold nuclear fusion 233-242
Fracture of solids
nuclear reaction during
electron fluxes in crack energies 233
neutron yield 233-234
Frenkel formula
in nucleation theory 2, 6
Friction. See also named type, e.g., Kinetic friction
boundary lubrication layer and
in kinetic friction 277-281
mechanical properties of 328-334
mechanism of 282-294
kinetic
boundary lubrication in 277-281
molecular theory of 328-329
Amonton's law and 310, 315
heuristic value of 329-330
of solid bodies 247-335
two-term law and 292-293, 309-310
one-term law and 293-294
rolling friction
adhesion role in 308-315, 317-327
force mmoment of 296-306
sliding adhesion and 317-324
of solid bodies 247-335
molecular theory of (in German) 247-261
slip on ice 262-276
two-term law of 291-294
dependence of load 292-293
vs. one-term law 293-294

Graphite
conversion to diamond 59-60, 61
formation in diamond synthesis 61, 62, 71, 81-83, 90

HEE. See High-energy electron emission
High-energy electron (HEE) emission
from crack zone 168, 177
from polymer films 168-173
decay kinetics and 169-171
theory 172-173
thermostimulated emission 170-171
tunneling mechanism in 170, 171, 172
High-speed electron emission in adhesion bond breaking 175-189
angular distribution in 179-180
calculation of density of charge 186
double electric layer breakup 176
experimental results 179-186
flux from surface 185-186
investigation technique 177-179
kinetic variations in 181-183
photon radiation in 183-185
from rolling friction 188-189
from sliding friction 189
in vacuum case 176-177
Homogeneous condensation
bilayer film rupture 29
improved
comparison with experimental data 7-9
theory of
statistical thermodynamics of nucleation and 10-14
Hydrocarbon layers
orientational ordering of
on quartz surface 50-56
dependences in 53, 54, 55
dichroism measurements in 52-53, 54
guest-host method in 52-53, 54
optical anisotropy in 52

Interface formation, adhesion in 95-230. See also Adhesion
Interlayers, thin, determination of thermodynamic thickness 376-382

Kinetic friction
boundary lubrication in 277-281
computation 278-279
description of wire apparatus 278
versus four ball friction machine 277
investigation by wire tribometer 277-281
measurement results 280
measuring procedure 278
static friction versus 280-281
Kramers-Fokker-Planck equation of nucleation theory
static cavitation in nonvolatile liquid 15

Lubrication. See also Boundary lubrication layer
boundary 282-291
water
slip friction on ice 269-270

Metal-dielectric interface
influence of polarization and 219-222
true density of double electric layer at 105-107
experiment and results 107
measurement system for 105-106
true diversity of double electric layer at 105-107
experiment and results 107
measurement system for 105-106
Molecular forces
in contact deformation 154-155, 157-167

Neutrons
emission from fracture of deuterium-containing substance 233, 234, 237-240
emission from titanium fracture 236
Nuclear reaction
during fracture of solids 233-234
under mechanical impact on deuterated solids 237-240
experimental scheme 238-239

(Nuclear reaction...mechanical)
explanations 240
lithium deuteride (LiD) and heavy ice (D_2) 237
results 239-240
Nucleation
2-D versus 3-D 22
general theory of 1-56
statistical thermodynamics of 10-14
Gibbs grand ensemble in 2-6, 10-11, 15, 23, 29

Orientationally ordered layers
of nonmesogen liquids 47-49
of saturated hydrocarbons and derivatives 50-56

Porous bodies
measurement of specific surface 337-340
Powders
measurement of specific surface
adsorption vs. permeametric method 368-369
new vs. Derjaguin instruments 370-371
results 372-374
viscous vs. free molecular flow 369

Rarefied gas
in specific surface measurement
of porous and disperse bodies 337-340
of powders 368-374
Rolling friction
adhesion role in 308-315
charge flow and 301-303
conclusions 315
dependence specific friction force and specific pressure 310-311
dielectric cylinder over steel cylinder 325-326 296-306
distribution surface charge density
cylinder at rest 297
cylinder rolling 113-114, 297-301
moment of friction force 114-118, 303-307
surface charge cylinder on surface 296-297
Roughness
in friction 330

Sliding friction
adhesion role in 317-324
Amonton's law 318, 319
dependence of friction force on normal load 320-323
molecular theory and 317-318
two-term law 319, 322, 323
electron emission from 189
Slip friction
on ice
boundary lubrication mechanism in 331-335
friction force 332-333
solids on ice 262-276
comparison of conclusions with experiment 274-276
conclusions 276
conclusions from theory 270-271
determination dynamic coefficient of friction 271-272
determination rated coefficient of friction 272-274
dry friction force 269
experimental technique 262-264
history of problem 262
results 264-268
roughness and 264, 270-271
theoretical investigation 268-270
water film lubrication 269-270
Specific surface measurements
of porous and disperse bodies
by resistance to rarefied gases 337-340
of powders
by filtering rarefied gases 368-374
Surface forces
influence on boundary layers and phases 40-43

Tearing-off force
sphere from solid body 208, 211
Thermodynamic thickness
of thin (non-Gibbsian) interlayers 376-382
film wetting solid substrate 379-381
fluid interlayer between two solids 381-382
liquid interlayer inside liquid phase 377-379

(Thermodynamic...thin)
problem definition 376
Thickness
thermodynamic
of thin interlayers
376-382

Viscosity
in boundary layers
blow-off measurement of
284-289
velocity profiles and 285,
286, 288-289, 290
Whisker crystals
in diamond synthesis 61, 65,
68-70, 83, 90

Zel'dovich formula
in nucleation 1, 15
Zirconium-deuterium (Zr-D)
system
DD reactions in control ex-
periments 243-244
materials in 242-243
neutron recording 243
pulse recording 243, 244
results 244-245
vibro-milling of zirconium
in 243

SEND FOR A FREE SAMPLE COPY OF ...

INTERNATIONAL JOURNAL OF SOLIDS AND STRUCTURES

Editor-in-Chief: **Charles Steele**, *Division of Applied Mechanics, Stanford University, Stanford, CA 94305, USA*
Consulting Editor and Editor-in-Chief 1965-1985: **George Herrmann**, *Division of Applied Mechanics, Stanford University, Stanford, CA 94305, USA*

(00297)
1994: Volume 31 (24 issues) Associated Personal price: **£185.00 (US$285.00)**
Subscription price: **£1323.00 (US$2035.00)**
ISSN 0020-7683

Audience: Mechanical and Civil Engineers, Materials Scientists.

AIMS AND SCOPE
The *International Journal of Solids and Structures* has as its objective the publication and dissemination of original research in mechanics of solids and structures as a field of applied science and engineering. It fosters the exchange of ideas among workers in different parts of the world and also among workers who emphasize different aspects of the foundations and applications of the field. The field of mechanics of solids and structures is experiencing considerable growth as a result of recent technological advances. The journal, by providing an international medium of communication, is encouraging this growth by encompassing all aspects of the field from the more classical problems of structural analysis to mechanics of solids continually interacting with other media, and including fracture, flow, wave propagation, heat transfer, thermal effects in solids, optimum design methods, model analysis, structural topology and numerical techniques. Interest extends to both inorganic and organic solids and structures.

A Selection of Papers
A.C. WIJEYEWICKREMA, L.M. KEER (USA), Matrix cracking in a fiber-reinforced composite with slip at the fiber-matrix interface.
Z. RYCHTER (Poland), Generalized displacements and the accuracy of classical plate theory.
YOSHIHIRO TOMITA, KENICHI HAYASHI (Japan), Thermo-elasto-viscoplastic deformation of polymeric bars under tension.
X. HUANG, B.L. KARIHALOO, W.B. FRASER (Australia), Contribution of first-order moduli differences to dilatant transformation toughening.
T.C.T. TING, D.M. BARNETT (USA), Image force on line dislocations in anisotropic elastic half-spaces with a fixed boundary.
W.J. STRONGE, T.G.ZHANG (UK), Warping of prismatic bars in torsion.
A.L. GOLDENVEIZER, J.D. KAPLUNOV, E.V. NOLDE (Russia), On Timoshenko-Reissner type theories of plates and shells.
CHENG LIU, ARES J. ROSAKIS, L.B. FREUND (USA), The interpretation of optical caustics in the presence of dynamic non-uniform crack-tip motion histories: a study based on a higher order transient crack-tip expansion.
D. BIGONI, E. RADI (Italy), Mode I crack propagation in elastic-plastic pressure-sensitive materials.
B. STORÅKERS, K.-F. NILSSON (Sweden), Imperfection sensitivity at delamination buckling and growth.

Indexed/Abstracted in: *Appl Mech Rev, Curr Cont ASCA, Cam Sci Abstr, Curr Cont/Eng Tech & Appl Sci, Eng Ind, INSPEC Data, Int Civil Eng Abstr, Math R, Mechanics, PASCAL-CNRS Data, Curr Cont Sci Cit Ind, Curr Cont SCISEARCH Data, SSSA/CISA/ECA/ISMEC, Materials Science Citation Index*

Pergamon

Pergamon is an imprint of Elsevier Science.
Sterling price quoted applies worldwide except in The Americas.
US dollar price quoted applies in The Americas only.
Prices include postage and insurance. Customers resident in the EU will be charged VAT (or the equivalent) at their own country's rate, unless a VAT (or equivalent) registration number is supplied. Elsevier Science VAT registration number in the UK: GB 490 6384 25 000.

Please send me a **FREE SAMPLE COPY** of **INTERNATIONAL JOURNAL OF SOLIDS AND STRUCTURES**

Name _____ Position _____
Organisation _____ Department _____
Address _____
_____ Post/Zip Code _____

Return to: Elsevier Science Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, UK
or Elsevier Science Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, USA

IHA4

SEND FOR A FREE SAMPLE COPY OF ...

INTERNATIONAL JOURNAL OF IMPACT ENGINEERING

Editor-in-Chief: **Norman Jones**, *Department of Mechanical Engineering, University of Liverpool, PO Box 147, Liverpool L69 3BX, UK*

(00700)
Subscription Rate 1994: Volume 15 (6 issues) Subscription price: **£265.00 (US$410.00)**
ISSN 0734-743X

Audience: Mechanical Engineers, Materials Scientists.

AIMS AND SCOPE
The International Journal of Impact Engineering exists for the publication of original research work concerned with the response of structures and bodies to dynamic loads arising from exposure to blast, collision or other impact events. The topics encompassed by the journal include the elastic and plastic response of structures and bodies to impact and blast loading, terminal ballistics, vehicle crashworthiness, containment and other processes and phenomena in which effects due to impact predominate, such as explosive welding. In addition, related matters such as research into fire hazards in association with impact loads will be included. Every paper accepted for publication is strictly refereed and assessed for its contribution to the understanding of impact phenomena or the insight gained for engineering design in areas of high rate loading. Papers whose concerns are only in the fields of mathematics, materials science or computation are not requested. Similarly, papers whose contents are purely descriptive will not be accepted. This journal should be of interest to engineers, designers and research workers in the fields of structural crashworthiness, energy-absorbing systems, structural failure, hazard assessments and safety calculations which involve impact loadings. Thus, papers in this journal will be of interest to aeronautical engineers, civil engineers, mechanical engineers, naval architects, nuclear engineers, ocean engineers, offshore engineers, transportation engineers and workers in other branches of engineering and science who are involved in impact loading of various kinds.

A Selection of Papers
W. GOLDSMITH, J.L. SACKMAN (USA), An experimental study of energy absorption in impact on sandwich plates.
C.E. ANDERSON Jr, B.L. MORRIS (USA), The ballistic performance of confined Al_2O_3 ceramic tiles.
K. OSAKADA, T. OKADA, Y. MIYAGAWA (Japan), Rigid-plastic finite element method for impact and high speed deformation problems.
P. ROBINSON, G.A.O. DAVIES (UK), Impactor mass and specimen geometry effects in low velocity impact of laminated composites.
S.J. HANCHAK, M.J. FORRESTAL, E.R. YOUNG, J.Q. EHRGOTT (USA), Perforation of concrete slabs with 48 MPa (7ksi) and 140 MPa (20 ksi) unconfined compressive strengths.
N.K. GUPTA, V. MADHU (India), Normal and oblique impact of a kinetic energy projectile on mild steel plates.
D. SHU, W.J. STRONGE, T.X. YU (UK), Oblique impact at the tip of a cantilever.
T.W. BJERKE, J.A. ZUKAS, K.D. KIMSEY (USA), Penetration performance of disk shaped penetrators.
Y.C. ANGEL, J.P. WHITNEY (USA), Ballistic limit for shielded plates subjected to hypervelocity impact.
V.P.M. SHIM, K.Y. YAP (Singapore), **W.J. STRONGE** (UK), Effects of nonhomogeneity, cell damage and strain-rate on impact crushing of a strain-softening cellular chain.

Indexed/Abstracted in: *Current Contents (Engineering, Technology & Applied Science), Engng Ind Monthly & Author Index, Appl Mech Rev, Cam Sci Abstr, Int Civil Eng Abstr, Metals Abstr, Materials Science Citation Index*

Pergamon

Pergamon is an imprint of Elsevier Science.
Sterling price quoted applies worldwide except in The Americas.
US dollar price quoted applies in The Americas only.
Prices include postage and insurance. Customers resident in the EU will be charged VAT (or the equivalent) at their own country's rate, unless a VAT (or equivalent) registration number is supplied. Elsevier Science VAT registration number in the UK: GB 490 6384 25 000.

Please send me a **FREE SAMPLE COPY** of **INTERNATIONAL JOURNAL OF IMPACT ENGINEERING (00700)**

Name _____ Position _____

Organisation _____ Department _____

Address _____

_____ Post/Zip Code _____

Return to: Elsevier Science Ltd, The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, UK
or Elsevier Science Inc., 660 White Plains Road, Tarrytown, NY 10591-5153, USA

IHA4